MARS: Model for the Assessment and Remediation of Sediments

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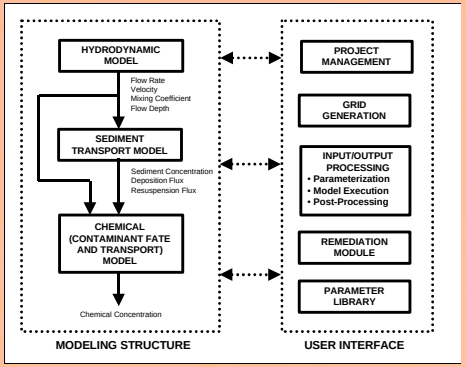
What is MARS?

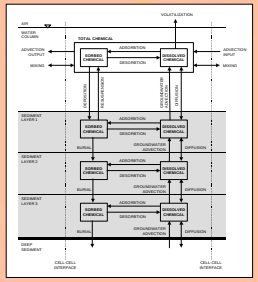
The Model for the Assessment and Remediation of Sediments, MARS, is a tool for modeling contaminated surface water sediments. It is a quantitative screening level analysis tool to predict future contaminant concentrations. The present version of MARS can be applied to non-tidal systems (e.g. rivers). A number of remediation alternatives can be evaluated. This includes natural attenuation, dredging and capping scenarios.

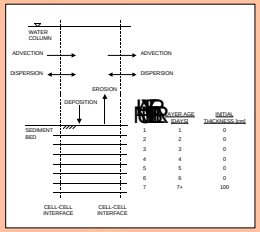
The model is tailored for application to former manufactured gas plant (MGP) sites. At those sites surface water sediments are often contaminated with polycyclic aromatic hydrocarbons (PAHs). PAHs are hydrophobic organic contaminants that sorb strongly onto sediment particles. To simulate the fate and transport of those compounds, MARS consists of three interconnected models:

- Hydrodynamic
- Sediment transport
- Chemical (Contaminant fate and transport)

The time-variable finite difference numerical models are applied to a two-dimensional (vertically integrated) water column and three-dimensional sediment bed represented by three vertical layers. The sediment transport model contains state-of-the-art cohesive sediment transport algorithms, including bed armoring. The contaminant fate and transport model includes kinetic transformations and transport affecting dissolved contaminants and the fraction sorbed to organic carbon. The user interacts with the models through a graphical user interface (GUI). Spatial input data and model results are viewed using geographic information system (GIS) technology. A site map can be scanned and used as a base map. An on-line parameter library provides guidance (parameter defaults, ranges and descriptions) in the setup of the model.







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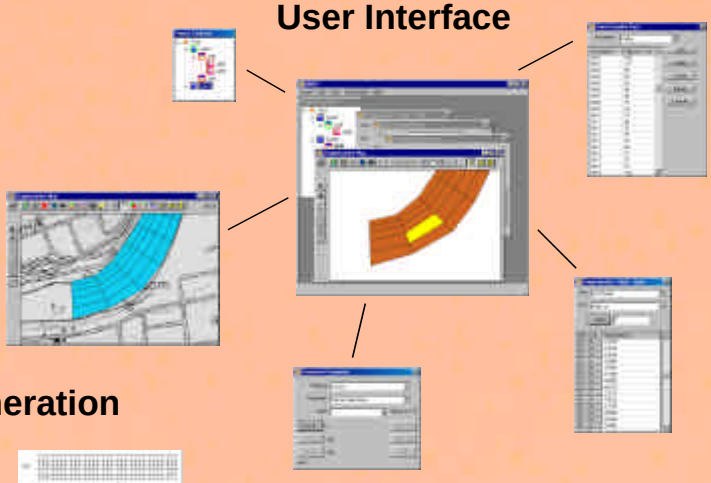
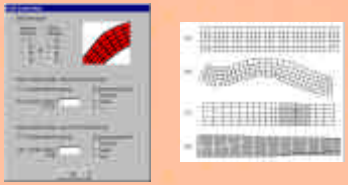
Remediation Wizard

Chemical Database

User Interface



Grid Generation



Movies

Application Examples